

Date: Tuesday, 12/18/2007 10:45:42 AM  
 User: Kim Johnston

## Process Sheet

Customer : CU-DAR001 Dart Helicopters Services	Drawing Name : MOUNTING BRACKET
Job Number : 36395	
Estimate Number : 11796	
P.O. Number :	Part Number : D2523
This Issue : 12/18/2007 S.O. No. :	Drawing Number : D2523 REV A2
Prsht Rev. : NC	Project Number : N/A
First Issue : / / Type : MACHINED PARTS	Drawing Revision : A2
Previous Run : 33047	Material :
Written By :	Due Date : 1/7/2008 Qty: 20 Um: Each
Checked & Approved By : <u>12/07/12/18</u>	
Comment : Est. C 01.04.16 Re format, added DT8560 EC	

## Additional Product

Job Number:



Seq. #:	Machine Or Operation:	Description :
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1.0	M6061T6B1000X12000	6061-T6 Bar 1.0" x 12.0"
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Comment: Qty.: 1.9031 f(s)/Unit Total: 38.0625 f(s)

6061-T6 Bar 1.0" x 12.0"

Material: 6061-T6 (QQ-A-200/8) 1.00" thick

Note: 2 per blank.

Batch

M104719

11.4186 f(s)

M106701 → 26.6434 f(s)

DIP 08/01/05

2.0	BAND SAW	BAND SAW
-----	----------	----------



Comment: BAND SAW

Cut blank: 21.75" x 12.00"

DIP 08/01/05

(10)

3.0	HAAS1	HAAS CNC VERTICAL MACHINING #1
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Comment: HAAS CNC VERTICAL MACHINING #1

Machine as per folio D2523

DIP 08/01/06

(22)

PTO

4.0	QC2	INSPECT PARTS AS THEY COME OFF MACHINE
-----	-----	--



Comment: INSPECT PARTS AS THEY COME OFF MACHINE

DIP 08/01/10

(22)

5.0	QC8	SECOND CHECK
-----	-----	--------------



Comment: SECOND CHECK

BF

(22)

6.0	SMALL FAB 1	SMALL & MEDIUM FAB RESOURCE 1
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Comment: SMALL & MEDIUM FAB RESOURCE 1

Deburr

Drill holes as per dwg D2523 using DT8560

FF 08-01-16

(22)

Dart Aerospace Ltd

W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: D2523 PAR #: JA Fault Category: Process mact NCR: Yes No DQA: JA Date: 08.01.25  
QA: N/C Closed: JA Date: 08.01.28

NCR: <u>36395</u>		WORK ORDER NON-CONFORMANCE (NCR)						
DATE	STEP	Description of NC Section A	Corrective Action Section B			Verification Section C	Approval Chief Eng	Approval QC Inspector
			Initial Chief Eng	Action Description Chief Eng	Sign & Date			
08/01/07	3.0	2 first parts, 1/2" Rougher pulled out of the holder/collet	<u>JA</u> 08.01.07	Reassemble tool in holder/collet. ensure tool is secure. scrub, destroy & replace Qty 2 B <u>106701</u>	<u>DJP</u> 08/01/07	<u>JA</u> 08/01/08	<u>JA</u> 08.01.08	<u>JA</u> 08.01.08
08/01/09	30	2 parts have the Dim. of 0.125" floor thickness of 0.100" EC mat. thickness	<u>JE</u> 08.01.09	Acceptable. See attached calculation	<u>J.L</u> 08/01/09	<u>JE</u> 08/01/10	<u>JE</u> 08.01.09	<u>JE</u> 08/01/10

NOTE: Date & initial all entries

Date: Tuesday, 12/18/2007 10:45:42 AM  
User: Kim Johnston

## Process Sheet

Customer: CU-DAR001 Dart Helicopters Services

Drawing Name: MOUNTING BRACKET

Job Number: 36395

Part Number: D2523

Job Number:



Seq. #:

Machine Or Operation:

Description:

7.0

QC5

INSPECT WORK TO CURRENT STEP



Comment: INSPECT WORK TO CURRENT STEP

5 08/01/16

8.0

HAND FINISHING1

HAND FINISHING RESOURCE #1



Comment: HAND FINISHING RESOURCE #1

Chemical Conversion Coat as per QSI 005 4.1

9/1 08-01-7

9.0

POWDER COATING

POWDER COATING



Comment: POWDER COATING

Powder Coat White Gloss (Ref: 4.3.5.1) as per QSI 005 4.3

Ticket #15/16  
M 106379

BR 08-01-23

(22)

10.0

QC3

INSPECT POWDER COAT/CHEMICAL CONVERSION



Comment: INSPECT POWDER COAT/CHEMICAL CONVERSION

M-1 08/01/23

(22X)

11.0

PACKAGING 1

PACKAGING RESOURCE #1



Comment: PACKAGING RESOURCE #1

Identify and Stock

Location: ST 197

Le 8/24 (22)

12.0

QC21

FINAL INSPECTION/W/O RELEASE



Comment: FINAL INSPECTION/W/O RELEASE

08.01.25

Job Completion



in 2008/1/24

W

#15 30 m  
23/01/2008  
S.00001 07.56  
#1 328.3 F  
#2 324.9 F  
B36395  
#15 30 m  
23/01/2008  
08.23  
S.00001

#16 30 m  
23/01/2008  
09.00  
S.00002

W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: \_\_\_\_\_ PAR #: \_\_\_\_\_ Fault Category: \_\_\_\_\_ NCR: Yes No DQA: \_\_\_\_\_ Date: \_\_\_\_\_

QA: N/C Closed: \_\_\_\_\_ Date: \_\_\_\_\_

NCR:		WORK ORDER NON-CONFORMANCE (NCR)						
DATE	STEP	Description of NC Section A	Corrective Action Section B			Verification Section C	Approval Chief Eng	Approval QC Inspector
			Initial Chief Eng	Action Description Chief Eng	Sign & Date			

NOTE: Date & initial all entries

<b>DART AEROSPACE LTD</b>		<b>Work Order:</b>	36395
<b>Description:</b> Mounting Bracket		<b>Part Number:</b>	D2523
<b>Inspection Dwg:</b> D2523 <b>Rev:</b> A2		<b>Page 1 of 1</b>	

### FIRST ARTICLE INSPECTION CHECKLIST

☒ First Article      ☐ Prototype

Drawing Dimension	Tolerance	Actual Dimension	Accept	Reject	Method of Inspection	Comments
Ø0.257	+0.005/-0.000	0.258	✓			
1.076	+/-0.010	1.0765	✓			
1.985	+/-0.010	1.9845	✓			
Ø0.257	+0.005/-0.001	0.258	✓			
9.372	+/-0.010	9.371	✓			
1.035	+/-0.010	1.0365	✓			
Ø0.191	+0.005/-0.000	0.193	✓			
7.546	+/-0.010	7.547	✓			
2.776	+/-0.010	2.775	✓			
2.776	+/-0.010	2.776	✓			
0.875	+/-0.010	0.8725	✓			
R0.125	+/-0.010	0.125	✓			
1.00	+/-0.030	1.010	✓			
R0.125	+/-0.010	0.125	✓			
0.750	+/-0.010	0.747	✓			
0.250	+/-0.010	0.256	✓			
R0.250	+/-0.010	0.250	✓			
0.125	+/-0.010	0.128	✓			
R0.125	+/-0.010	0.125	✓			
R0.063	+/-0.010	0.0625	✓			

<b>Measured by:</b> DSP	<b>Audited by:</b> gmk	<b>Prototype Approval:</b>	N/A
<b>Date:</b> 08/01/07	<b>Date:</b> 08/01/07	<b>Date:</b>	N/A

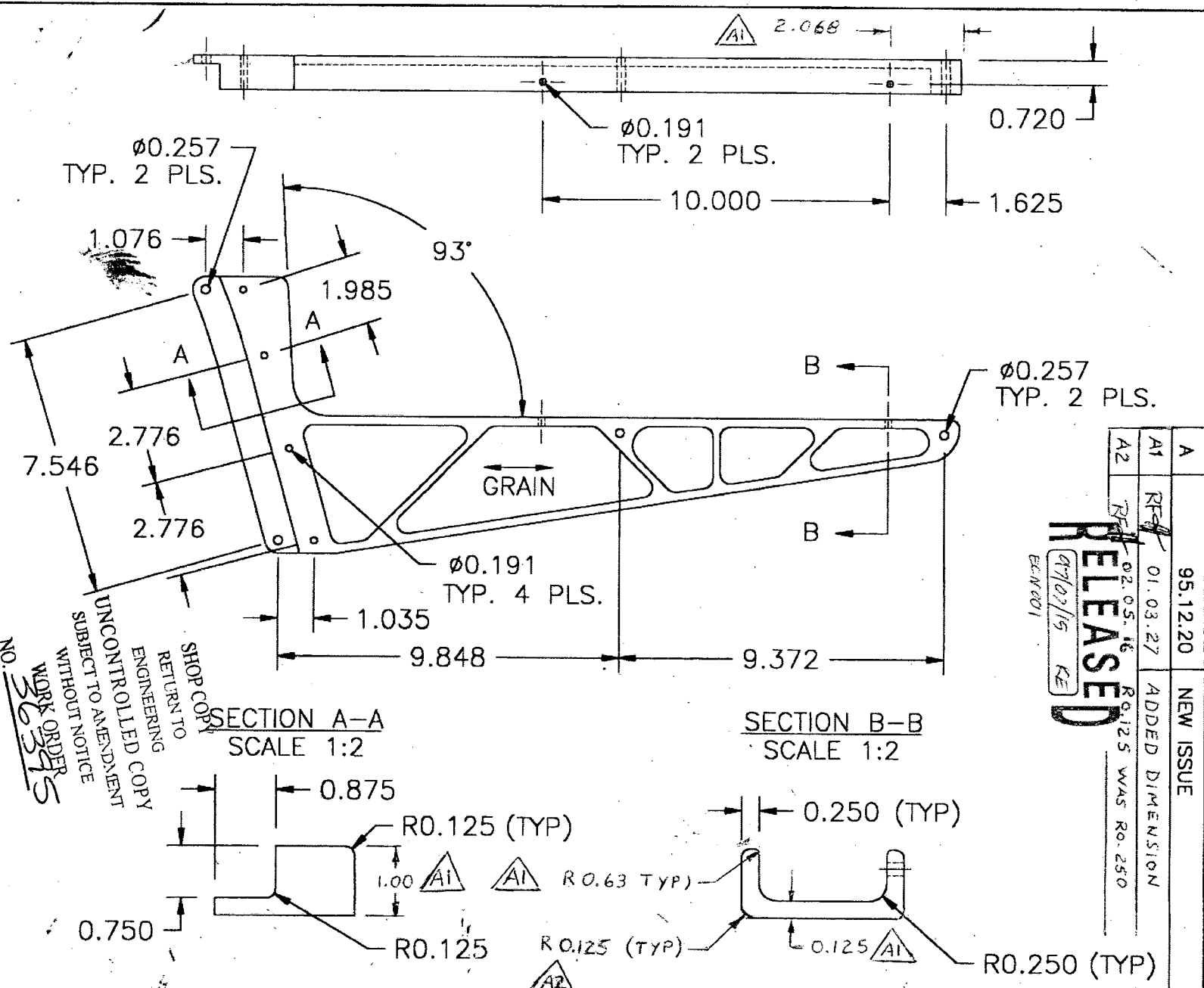
Rev	Date	Change	Revised by	Approved
A	05.02.17	New Issue	KJ/JLM	<i>[Signature]</i>

**DART**



DESIGN	DRAWN BY	DART AEROSPACE LTD VICTORIA INTERNATIONAL AIRPORT, CANADA
CHECKED <i>BW</i>	APPROVED <i>KE</i>	DRAWING NO. D2523
DATE 95.12.20	TITLE MOUNTING BRACKET	REV. A
		SHEET 1 OF 1
		SCALE 1:4
A	95.12.20	NEW ISSUE
A1	01.03.27	ADDED DIMENSION
A2	02.05.16	R0.125 WAS R0.250

**RELEASED**  
07/07/15 KE  
ECN001

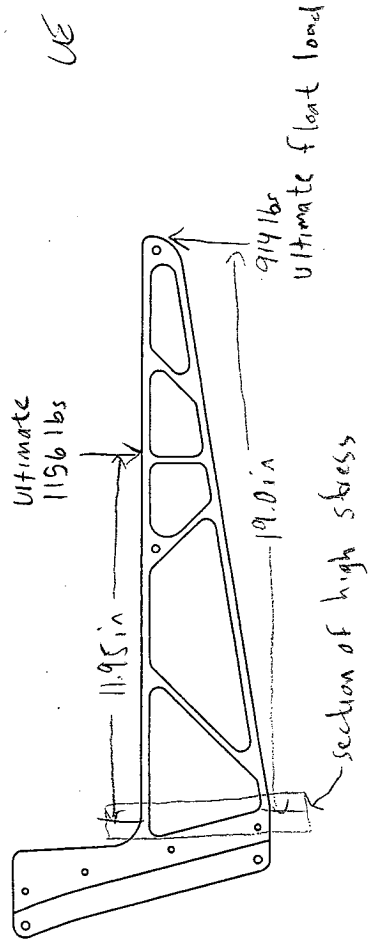


MATERIAL: 6061-T6 QQ-A-200/8 1.00 THICK  
 FINISH: ACID ETCH, ALODINE PER DART QSI 005 4.1  
 POWDER COAT GLOSS WHITE PER DART QSI 005 4.3

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NO. 36345  
 WORK ORDER  
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 ENGINEERING

UE 08.01.07



Moments:

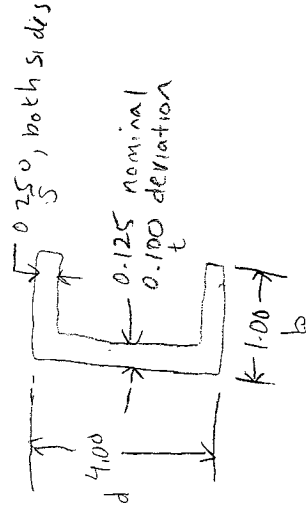
$$\sigma = \frac{M_c}{I}$$

$$M_1 = (1156 \text{ lbs})(11.95 \text{ in}) = 13814 \text{ in-lbs}$$

$$M_2 = (914 \text{ lbs})(19.0 \text{ in}) = 17366 \text{ in-lbs}$$

Use higher stress in calculation  $\therefore$  use  $M_2$ .

Cross-Section:



$$I = \frac{bd^3 - h^3(b-t)}{12}$$

$$h = d - 2t = 4.0 - 2(0.25) = 3.5 \text{ in}$$

$$c = \frac{d}{2} = 2.0 \text{ in}$$

$I_n$  = moment of inertia, nominal

$I_d$  = moment of inertia, deviated

$$I_n = \frac{(1.0)(4.0)^3 - (3.5)^3(1 - 0.125)}{12}$$

$$I_n = 2.207 \text{ in}^4$$

$$I_d = \frac{(1.0)(4.0)^3 - (3.5)^3(1 - 0.100)}{12}$$

$$I_d = 2.118 \text{ in}^4$$

$$\sigma_n = \frac{M_2 c}{I_n} = \frac{(17366 \text{ in-lbs})(2.0 \text{ in})}{2.207 \text{ in}^4} = 15737 \text{ psi}$$

$$\sigma_d = \frac{M_2 c}{I_d} = \frac{(17366 \text{ in-lbs})(2.0 \text{ in})}{2.118 \text{ in}^4} = 16370 \text{ psi}$$

Max stress is 42000 psi (ultimate) of 6061-T6

Margin of safety =  $\frac{\sigma_{max}}{\sigma_1} - 1 = 1.57 \therefore$  deviation is acceptable

**Moments of Inertia, Section Moduli, and Radii of Gyration (Continued)**

Section	Area of Section, $A$	Distance from Neutral Axis to Extreme Fiber, $y$	Moment of Inertia, $I$	Section Modulus, $Z = I/y$	Radius of Gyration, $k = \sqrt{I/A}$
<b>C-Sections</b>					
	$dt + a(s + n)$	$\frac{d}{2}$	$\frac{1}{12} \left[ bd^3 - \frac{1}{8g} (h^4 - t^4) \right]$ $g = \text{slope of flange}$ $= \frac{h-t}{2(b-t)} = \frac{1}{2}$ for standard channels.	$\frac{1}{6d} \left[ bd^3 - \frac{1}{8g} (h^4 - t^4) \right]$	$\sqrt{\frac{\frac{1}{12} \left[ bd^3 - \frac{1}{8g} (h^4 - t^4) \right]}{dt + a(s + n)}}$
	$dt + 2a(s + n)$	$b - \left[ b^2 s + \frac{ht^2}{2} + \frac{g}{3} (b-t)^2 \right] \times (b+2t) + A$ $g = \text{slope of flange}$ $= \frac{h-t}{2(b-t)}$	$\frac{1}{12} \left[ 2sh^3 + lt^3 + \frac{g}{2} (b^4 - t^4) \right] - A(b-y)^2$ $g = \text{slope of flange}$ $= \frac{h-t}{2(b-t)}$ for standard channels.	$\frac{I}{y}$	$\sqrt{\frac{I}{A}}$
	$bd - h(b-t)$	$\frac{d}{2}$	$\frac{bd^3 - h^3(b-t)}{12}$	$\frac{bd^3 - h^3(b-t)}{6d}$	$\sqrt{\frac{bd^3 - h^3(b-t)}{12[bd - h(b-t)]}}$

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MOMENT OF INERTIA, SECTION MODULUS

**Moments of Inertia, Section Moduli, and Radii of Gyration (Continued)**

Section	Area of Section, $A$	Distance from Neutral Axis to Extreme Fiber, $y$	Moment of Inertia, $I$	Section Modulus, $Z = I/y$	Radius of Gyration, $k = \sqrt{I/A}$
	$bd - h(b-t)$	$b - \frac{2b^2s + ht^2}{2bd - 2h(b-t)}$	$\frac{2}{3} (b^3 + ht^3) - A(b-y)^2$	$\frac{I}{y}$	$\sqrt{\frac{I}{A}}$
<b>T-Sections</b>					
	$bs + ht$	$d - \frac{d^2t + s^2(b-t)}{2(bs + ht)}$	$\frac{1}{12} [ty^3 + b(d-y)^3 - (b-t)(d-y-s)^3]$	$\frac{I}{y}$	$\sqrt{\frac{\frac{1}{12} [ty^3 + b(d-y)^3 - (b-t)(d-y-s)^3]}{bs + ht}}$
	$\frac{h(T+t)}{2} + tn + a(s+n)$	$d - [3s^2(b-t) + 2am(m+3s) + 3Td^2 - l(T-t)(3d-l)] \div 6A$	$\frac{1}{12} [l^3(T+3t) + 4bn^3 - 2am^3] - A(d-y-n)^2$	$\frac{I}{y}$	$\sqrt{\frac{I}{A}}$
	$bs + \frac{h(T+t)}{2}$	$d - [3bs^2 + 3ht(d+s) + h(T-t)(h+3s)] \div 6A$	$\frac{1}{12} [4bs^3 + h^3(3t+T)] - A(d-y-s)^2$	$\frac{I}{y}$	$\sqrt{\frac{I}{A}}$

MOMENT OF INERTIA, SECTION MODULUS

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